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Double Signals or Single Signal?
An Investigation of Insider Trading Around Share Repurchases

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Abstract

This study examines directors' dealing activity around share repurchasing periods in Hong Kong. There are significant insider trading activities before the share repurchasing period. Consistent with the signaling hypothesis, the directors' purchase activities during the share repurchase period are significantly higher than the expected level while the directors' sale activities are abnormally lower than the expected level. Double signals of share repurchases and directors' purchases create a stronger signal in conveying undervaluation. However, insider sales around share repurchase discounts the undervaluation signal. This study provides some evidence that information signaling is a dominating factor driving the share repurchase decision.

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1. Introduction

The presence of information asymmetry in financial markets has given rise to voluminous research studies that investigate different signaling devices conducted by insiders. It is an empirical question as to whether insiders use their informational advantage to time their trading and to signal mispricing. Both share repurchases and insider trading are related to and may be motivated by the level of information asymmetry between firms and their directors and the outside investors.

The presence of mispricing in an informationally asymmetric market can be examined by using the concurrent signals conveyed by the firms and the directors through their securities transactions in the market. This study examines insider trading activity around the repurchasing period and uses the simultaneous signal of share repurchase and insider trading to investigate whether the signaling hypothesis is a dominating factor driving share repurchases.

There are many theories explaining the motive and pricing behaviour of share repurchases. While most studies test and compare two or three motives of share repurchase, Dittmar (2000) examines six share repurchase hypotheses using data from the US. Dittmar finds information signaling to be the major motive throughout the whole sample period while other motives are valid in sub-periods. The examination of the two trading signals, share repurchase, and directors' dealings, conducted by the firms and the directors, provides evidence on their relative pricing effects (i.e., the magnitude of market reaction) and the credibility of the undervaluation message.

Previous studies on share repurchases provide results based on the US market setting. The recent implementation of regulations allowing share repurchases in other markets provides opportunities for research studies under different market settings such as Australia, the UK, and Canada (Harris and Ramsay, 1995; Rees, 1996; Ikenberry, Lakonishok and Vermaelen, 2000). The event day for examination is usually the share repurchase announcement date. In Hong Kong, there is no regulatory rule for the firms to make a mandatory repurchase announcement to the public before they formally conduct their repurchase transactions as long as the repurchase decision is already approved through an ordinary shareholder resolution.[1] Ikenberry, Lakonishok and Vermaelen state that the completion rate (the number of shares actually purchased) may reflect the motives for repurchases as well as the share price reaction to repurchases. The market appears to discount the information in repurchase announcements. This study uses the actual repurchase transaction as the event date to measure the share price reaction to the share repurchase. Therefore, the possibility of a mismatch in the percentage of shares targeted in the repurchase announcements and that subsequently acquired in actual repurchases is eliminated.[2] In addition, the timing ability of the managers to buy undervalued shares can be evaluated only if the actual transaction date is precisely identified.

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[1] In Hong Kong, the repurchasing firms have to comply with the Code on Share Repurchase and Chapter 10 (Equity Securities: Restrictions on Purchase and Subscription) of Exchange Listing Rules when they buy-back their shares. Rule 10.06 (1) (a) (iii) of the Listing Rules states that the shareholders of the repurchasing firms have to approve the repurchase decision (a general mandate) by way of an ordinary resolution at a General Meeting.

[2] Stephens and Weisbach (1998) report that only about 74% to 82% of the shares targeted in the repurchase announcement are subsequently acquired in the three years after the repurchase announcement. Ikenberry, Lakonishok and Vermaelen (2000) find 22.3% of firms making repurchase announcements do not repurchase any shares within 12 months and the average completion rate for Canadian repurchases is 28.6%.

Although the repurchasing firms are not required to make repurchase announcements, they are requested to report their repurchase transactions (the number of shares repurchased and the price at which the shares are repurchased) to the Hong Kong Exchange on the following day. The mandatory disclosure requirement on a daily basis allows the examination of the market reaction to share repurchases in a more effective way. Share repurchase activity in Hong Kong is not a single-day event. There are many cases where the repurchasing firms buy their shares over a time period (as long as the total quantity of shares repurchased does not exceed the 10% rule which sets an upper limit on the quantity of repurchases within the yearly mandate). The motives for share repurchase activity and the characteristics of repurchasing firms may lead to differences in trading frequency. These differences in the market setting, announcement and disclosure requirements and the high frequency of share repurchase transactions within short time periods may cause the market to behave in a different way from the US studies documented in the literature.

The intensive repurchase transactions conducted within a time period create clustering problems for event studies. To minimize the problems of event clustering on return measurement, this study employs the control firm approach to estimate both the short-term and long-term share price performance of the repurchasing firms. In addition to examining the market reaction of the repurchasing firms with insider trading activity, based upon the methodology of Stephens and Weisbach (1998) and Dittmar (2000), this study also uses a Tobit model to determine the motives for share repurchase decisions in Hong Kong. Three hypotheses, excess cash, information signaling, and leverage, are tested. Dittmar uses the market-to-book ratio and historical return as proxies for undervaluation and firm size as a proxy for information asymmetry. Various measures of insider trading activity are included in the models to examine the information signaling hypothesis of the "Buy" and "Sell" decisions of the firms and their directors.

Between 1993 and 2002, there were 10,076 share repurchase transactions in Hong Kong. Directors' trading activity is found before, during and after the time when the firms conduct their share repurchase activity. However, purchases are not the exclusive trading strategies of directors that accompany share repurchase transactions during the repurchasing period. The event study results show that share repurchases perform a correctional signal of undervaluation. However, the presence of directors' trading signals around the repurchasing period complicates the market responses for share repurchases. The market appears to discount the undervaluation message of the repurchase signal when it is accompanied by directors' sales. The "Sell" signal is more effective in conveying the overvaluation message. The Tobit regression model fails to detect any dominant factor that motivates the share repurchase decision. In the model, only firm size is significant.

This essay proceeds as follows. The literature review and the hypotheses of the study are presented in Section 2. Section 3 describes the data and methodology. The empirical results and conclusion are reported in Section 4 and Section 5, respectively.

2. Literature Review and Hypothesis Development

The share repurchase phenomenon has been widely explored in the finance literature. There are a number of theories explaining the motives and price behaviour of repurchasing firms. In the literature, the share repurchase event has been tested for the signaling hypothesis (Vermaelen, 1981; Ikenberry, Lakonishok and Vermaelen, 1995), the leverage hypothesis (Masulis, 1980; Pugh and Jahera, 1990), the wealth transfer hypothesis (Dann, 1981; Wansley and Fayez, 1986), the personal taxation hypothesis (Masulis, 1980), the free cash flow hypothesis (Denis, Denis and Sarin, 1994; Jagannathan, Stephens and Weisbach, 2000), the anti-takeover mechanism (Bagnoli, Gordon and Lipman, 1989; Denis, 1990; Mikkelson and Ruback, 1991; Bagwell, 1991) and earnings per share growth hypothesis (Dann, Masulis and Mayers, 1991; Hertzel and Jain, 1991; Bartov, 1991).

There are also many studies (Howe, He and Kao, 1992; Perfect, Petersen and Petersen, 1995; Nohel and Tarhan, 1998; Dittmar, 2000) conducted to distinguish among the different hypotheses as explanations of the market reaction in order to find out the most appropriate theory that best explains share repurchases. Among the many theories explaining the motive and price behaviour for share repurchasing firms, the signaling hypothesis holds centre stage. The signaling hypothesis argues that a share repurchase is caused by the informational difference about the true value of the firms' shares between the market and the firms. Owing to the informational asymmetry, insiders have better private information about the present mispricing and future prospects of their firms' shares which is not available to the outsiders.[3] Firms are more likely to buy their shares back when they perceive their shares are undervalued by the market. The repurchase action therefore represents a correctional signal for market misvaluation. Many studies (Vermaelen, 1981; Comment and Jarrell, 1991; Ikenberry, Lakonishok and Vermaelen, 1995; Liu and Ziebart, 1997; Stephens and Weisbach, 1998) examine the share price reaction of share repurchase announcements and find positive returns around them.

In the insider trading literature, many studies have been conducted that examine the insider trading activities around specific corporate announcements.[4] Most of the findings show that insider trading activity increases around a financial event. According to the information signaling hypothesis, management of the firms may trade in the market to perform a signaling function. An insider purchase (sale) is a signal of undervaluation (overvaluation) of their firms' shares. Some empirical studies on insider trading (Seyhun, 1986; Rozeff and Zaman, 1988; Lin and Howe, 1990; Jeng, Metrick and Zeckhauser, 1999) also report positively significant abnormal returns for insiders. All these studies not only provide evidence that insiders have timing ability to disclose private information to the market, but also demonstrate a "regular" trading pattern that insiders usually buy (sell) before good (bad) news and when the share prices are low (high), thus causing significant share price increase (decrease).

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[3] In a survey research of 140 financial officers of the US firms conducted by Wansley, Lane and Sarker (1989) about their opinions on the possible explanations for share repurchase, the summary results state that the managers use share repurchases to signal their confidence in the present and future values of their shares.

[4] Examples of these studies on corporate announcements include dividend payouts (John and Lang, 1991); mergers and acquisitions (Meulbroek, 1992); rights issues (Kahle, 2000); corporate bankruptcy petitions (Seyhun and Bradley, 1997); firms' listing and delisting (Lamba and Khan, 1999) and analysts' earnings forecast revisions (Sivakumar and Vijayakumar, 2001).

As both share repurchase and insider trading activities can be motivated by information signaling, some US studies examine the insider trading activity around the share repurchase announcement to evaluate the signaling function performed by the firms (through share repurchase) and the insiders (through directors' dealing). Lee, Mikkelson and Partch (1992) study the intensity of managerial trading around the time when their firms announce a repurchase of their firms' shares by tender offer in the sample period from 1977 to 1988. They find an increase in managerial buying and / or a decrease in managerial selling around the share repurchase offer. Raad and Wu (1995) test specifically the share price returns of insider trading activity around an open market share repurchase announcement. They report that there is significant market reaction for the share repurchase cases with insider trading activity occurring one month before the announcement. The insider net buying activity generates larger and more significant abnormal returns for repurchasing firms.

Therefore, if informed trading (share repurchase and directors' dealing) is motivated by signaling purpose, share repurchase should be accompanied by directors' purchases rather than directors' sales. It is expected that the intensity of directors' buying activity should be significantly greater than the intensity of selling activity around the repurchasing period. Furthermore, the market should reflect a stronger signal of share undervaluation conveyed by the joint effect of the purchases of the firms and the directors. Therefore, it is hypothesized that those share repurchase cases that are accompanied by directors' purchases should result in a more favourable market reaction than the share repurchase cases without inside transactions, which, in turn, should cause a more positive market reaction than the share repurchase cases paired with directors' sales.

As share repurchases can be motivated by many factors besides information signaling, many empirical studies on share repurchase investigate the different reasons (e.g., free cash flow, market for corporate control, and optimal leverage) for share repurchase. Dittmar (2000) argues that the share repurchase studies focusing on only few motives may not provide a complete explanatory picture of share repurchases. Dittmar investigates six share repurchase hypotheses (excess cash distribution, undervaluation, capital structure adjustment, management compensation, takeover defense, and firm size) in a Tobit model to examine if there is a dominating motive and how these different motives may interrelate. Based upon the Tobit regression model of Stephens and Weisbach (1998) and Dittmar, this study includes an additional information signaling variable (insider trading activity) to explore the signaling function performed by the firms and the directors in Hong Kong.

3. Data and Methodology

3.1 Data

The study covers a 10-year period from 1993 to 2002. The data for share repurchase and insider trading transactions are extracted from the databases of the Company Buy-backs and Directors' Dealings respectively of the Inside Trade Asia Database of Primark. The share price returns and accounting data are retrieved from the Company Returns file and Financial Statements file respectively of the PACAP database.

The Primark database maintains an electronic record of share transactions of directors and share repurchases from 1993 onwards. The sources of data for these two data sets are the Share Repurchase Report and Directors' / Chief Executives' Notification Report which are components of the Securities (Disclosure of Interest) Daily Summary issued by the Hong Kong Exchanges. The repurchasing firms are obliged by the Listing Rules of the Hong Kong Exchanges to disclose their repurchase transactions to the Hong Kong Exchange on the next trading day. The Laws of Hong Kong (Chapter 396) require directors to report to the Hong Kong Exchange on their securities transactions within five days from the day they make the transactions. From April 2000 onwards, we collect the share repurchase and insider trading data from Hong Kong Exchanges.

Table 1 shows the summary statistics of the share repurchase activity in Hong Kong between 1993 and 2002. As presented in Panel A, over the ten years, there are 694 firms purchasing 7,437 million of shares with a value of HK$ 29,998 million in 10,076 transactions. On average, there are about 14.52 transactions per repurchasing firm. Panel B of Table 1 shows that the frequency of share repurchase transactions in Hong Kong is high. More than half (57.84%) of the total share repurchase transactions occur one day after a previous transaction or one day before a subsequent transaction.

3.2 Methodology

Measurement of Abnormal Insider Trading Activity

This study focuses on the issue of whether insiders make use of their inside information about the repurchase decision of the firms to also trade in the market for their own personal accounts. Therefore, the intensity of the insider trading activity around the repurchasing period is examined. The prior-period comparison method is used to measure the abnormal insider trading (Gombola, Lee and Liu, 1997). The prior period used as a comparison is the 6-month period from m = -12 to m = -7 before the repurchasing month (m = 0).

The average trading measures (number of shares, market value and number of transactions) computed during the comparison period ($-12 \leq m \leq -7$) is used as the expected trading measure when benchmarking with the actual insider trading measures during the seven months of the examination period ($-6 \leq m \leq 0$). Therefore, the abnormal trading measure is the difference between the actual level and expected level of each of the trading measures. The method of Brown and Warner (1985) is used to test the significance of the intensity of the insider trading.

Measurement of Abnormal Share Price Performance

In order to examine if the share repurchase decision of a firm is a signal of undervaluation to the market, the share price performance around the repurchasing period should be examined. The control firm approach is used to measure the abnormal return which is the difference between the actual return of a sample firm and that of a control firm.

Event clustering for corporate announcements is a common problem inherent in many event studies. When the market-adjusted model is used to measure the share price reaction of any corporate announcement, the announcement clustering problem may generate estimation bias in the computation of returns. To avoid the potential impact of event clustering, the control firm approach is employed to measure returns. A control firm is selected for abnormal return computation if the firm is clean from the event under examination, which, in this study, is the repurchase and insider trading activity. Furthermore, Barber and Lyon (1997) find that the control firm approach yields well-specified test statistics for the abnormal returns measured.

For the control firm approach, both the sample firm and the control firm selected for comparison should have similar characteristics in terms of market value and book-to-market value (Fama and French, 1992).[5] The monthly market value and book-to-market value of all the industrial firms in the PACAP database are computed and categorized into 10 groups. A control firm is matched to a sample firm if the control firm has the same rankings (from 1 to 10) of market value and book-to-market ratio as the sample firm does. As this study examines the abnormal share price reaction of the repurchasing firms, the control firm should have conducted no repurchase transaction during the examination period ($-30 \leq t \leq +250$).

Another objective of the study is to test if there are different share price reactions for the different "double" signals of share repurchase and insider trading (share repurchase paired with insider purchase and share repurchase paired with insider sale). Therefore, it is also an essential condition that the control firm selected should also be clean from the insider trading transactions during the examination period. With these four selection criteria, the original sample size of 8,295 observations is reduced to 3,290 observations for the event study.

The share repurchase activity in Hong Kong is not a single-day event. Table 1 shows that there is a high frequency of share repurchase transactions (81% of the transactions are conducted within five days of a previous repurchase transaction). The repeated share repurchase transactions should lessen the pricing impact of the repurchasing signal on the market as the efficient market hypothesis argues that the share price reaction should be the most pronounced for the first released information. Therefore, the measurement of the abnormal return is restricted to those observations where there is no share repurchase transaction within a 5-day period before the observed transaction. This additional condition condenses the final sample to 607 observations.

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[5] Monthly data are used to compute the market value and book-to-market value. The market value is the product of the number of outstanding shares and monthly average price. The book-to-market value is the ratio of the average book value of the shareholders' equity to market value of equity.

Regression Model

In the share repurchase literature, many empirical studies have been conducted to explore the motivations for share repurchase. Dittmar (2000) tests six of the many hypotheses (excess capital hypothesis, dividend substitution hypothesis, undervaluation hypothesis, optimal leverage ratio hypothesis, takeover deterrence hypothesis and management incentive hypothesis) in a Tobit model. In this study, three of the hypotheses (free cash flow hypothesis, information signaling hypothesis and leverage hypothesis) are tested.[6]

There are two regression models in the study. The dependent variables of the two regressions are the level of abnormal returns of repurchase transactions and the intensity of share repurchases. The first model with the level of abnormal returns as the dependent variable, examines the different motivations for share repurchases. The second model distinguishes among different motivations of share repurchase with the aim of finding the motivation that best explains the repurchase decision.[7]

The regressions are defined as:

$$\begin{aligned} CAR = {} & \alpha_0 + \beta_1\, CFY\text{-}1 + \beta_2\, CashY\text{-}1 + \beta_3\, DividendY\text{-}1 + \beta_4\, MKBKRY\text{-}1 \\ & + \beta_5\, AbRetY\text{-}1 + \beta_6\, NetInsiderY + \beta_7\, OWNY + \beta_8\, LnTAY\text{-}1 \\ & + \beta_9\, ReptranY + \beta_{10}\, InterIRY + \beta_{11}\, LeverageY\text{-}1 \end{aligned} \tag{1}$$

$$\begin{aligned} RepshareY = {} & \alpha_0 + \beta_1\, CFY\text{-}1 + \beta_2\, CashY\text{-}1 + \beta_3\, DividendY\text{-}1 + \beta_4\, MKBKRY\text{-}1 \\ & + \beta_5\, AbRetY\text{-}1 + \beta_6\, NetInsiderY + \beta_7\, OWNY \\ & + \beta_8\, LnTAY\text{-}1 + \beta_9\, LeverageY\text{-}1 \end{aligned} \tag{2}$$

CAR is the cumulative abnormal return over different time periods examined ($-1 \le t \le -1$, $-3 \le t \le +3$, $-10 \le t \le +200$, $-30 \le t \le +30$, $-30 \le t \le +120$ and $-30 \le t \le +200$). RepshareY is the measure of share repurchase activity (the ratio of the number of repurchased shares to the number of outstanding shares) at year y.

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6 The anti-takeover mechanism and the management incentive hypotheses are not tested due to the limited number and availability of cases for analysis in Hong Kong.

7 The second regression model is a censored regression (Tobit) model. In some model settings where the dependent variable is only partially observed, the Tobit regression model can be used. In equation (2), the values for RepshareY are identified for repurchasing firms. The values for RepshareY are left censored for non-repurchasing firms. Therefore, the Tobit model codes the censored dependent variable as zero.

Excess Capital

If there is free cash flow in a firm, the firm may use the free cash for future investment, dividend distribution and share repurchase (Barclay and Smith, 1988; Comment and Jarrell, 1991; Ikenberry, Lakonishok and Vermaelen, 1995; Stephens and Weisbach, 1998; Jagannathan, Stephens and Weisbach, 2000). CFY-1, CashY-1 and DividendY-1 are the three variables testing the free cash flow hypothesis. CFY-1 is the ratio of cashflow from operations to total assets at year y-1.[8] CashY-1 is the ratio of the sum of cash and marketable securities to total assets at year y-1. DividendY-1 is the aggregate amount of dividends paid (interim, special cash and final) divided by net income before extraordinary items at year y-1.

Free Cash Flow

Firms can only launch their repurchase transactions if they have excess cash. Therefore, there should be a positive relation between CFY-1 and CashY-1 with RepshareY. Furthermore, if the share repurchase transaction is supported by sufficient cash flow, a positive relation is also expected between the abnormal returns for repurchase transactions and the motivation for share repurchase.

Substitute for Dividend Distribution

In the US where dividend income is taxable, there is a tax advantage from using share repurchases as an alternative means to dividend distribution to return free cash flow to shareholders (Barclay and Smith, 1988). Share repurchases and dividends are substitutes of each other (Grullon and Michaely, 2002). Stephens and Weisbach (1998) report that the dollar value of announced share repurchases is about 50% of total dividend payout (US$ 65 billion) in 1994. However, in Hong Kong, dividend income is not taxable. There is also no capital gains tax. Therefore, there is no tax preference between a share repurchase and a dividend. If share repurchases and dividends are substitutes of each other because of the tax advantage of capital gains tax and personal tax, there should be a negative relation between DividendY-1 and RepshareY in the Tobit model. However, share repurchases can be a more flexible way for cash to be distributed than dividends as there is no market expectation for share repurchase to be a recurrent event.[9] Therefore, if there is a negative relation between DividendY-1 and RepshareY in the Tobit model using Hong Kong data, it will be due to the flexibility advantage offered by share repurchase as a means of returning excess and / or transitory cash flows to shareholders. However, if dividend and share repurchases are not substitutes, a positive distribution of dividend in the previous year and an additional distribution of excess capital to the investors in form of share repurchase is good news to the market. It is expected that there should be a positive relation between the abnormal returns for repurchase transactions and DividendY-1.

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[8] Cash flow from operations is estimated by using the indirect method to convert operating income to operating cash flow.

[9] There have been a lot of studies on dividend omissions and reduction in dividend distributions. Most of them find that dividend omissions and reduction have a negative signaling effect on the market (e.g., Bajaj and Vijh, 1990; Denis, Denis and Sarin, 1994).

Information Signaling

The information signaling hypothesis argues that a share repurchase is motivated by the informational asymmetry between the firms and the outsiders. Several variables (MKBKRY-1, AbRetY-1, NetInsiderY, OWNY, LnTAY-1, ReptranY and InterIRY) are used as information asymmetry proxies to test the information signaling hypothesis. Justifications for these variables are provided below. MKBKRY-1 is the ratio of the sum of market value of equity and total liabilities to total assets at year y-1. AbRetY-1 is the market adjusted abnormal return from year end y-2 to year end y-1. NetInsiderY is the measure of insider trading activity (the percentage of net number of shares traded to the number of outstanding shares) at year y. OWNY is the percentage share ownership of insider trades at year y.[10] LnTAY-1 is the log value of total assets at year y-1. ReptranY is the measure of share repurchase activity (the log value of the number of repurchase transactions) at year y. InerIRY is an interactive term of insider trading and share repurchase activities (the product of NetInsiderY and ReptranY).

Prior Firm Performance

The managements of firms are better informed than outsiders about the true value of the firms. Firms conduct share repurchases more aggressively if they believe their firms to be under-invested and to be undervalued (Stephens and Weisbach, 1998; Ikenberry, Lakonishok and Vermaelen, 2000). Ikenberry, Lakonishok and Vermaelen (2000) find that there is greater repurchase activity when share prices fall. To examine whether firms have the motive to repurchase when the share price is undervalued, Dittmar (2000) uses the market-to-book ratio and historical return as measures of undervaluation. In this study, the market-to-book ratio and the historical return are captured by MKBKRY-1 and AbRetY-1, respectively. The undervaluation hypothesis suggests that the abnormal returns for repurchasing firms and the share repurchase decision should be negatively related to the market-to-book ratio and historical return.

Insider Trading Activity

Besides using the market-to-book ratio and historical return as proxies of undervaluation, this study also employs insider trading measures to test the signaling hypothesis. If firms repurchase shares in order to take advantage of the undervaluation of their shares, the directors of the firms who trade in the market should also make use of the inside information of underpricing to make a “Buy” signal. Raad and Wu (1995) find that the shareholders of repurchasing firms with insider trading activities earn positive abnormal returns. If “Purchase” of shares is motivated by undervaluation, there should be a positive relation between abnormal returns for repurchase and RepshareY with NetInsiderY.

[10] If there is more than one insider trading in the shares of the firm concerned, the percentages of the ownership of all the trading insiders involved are aggregated.

Management Share-holding

The share-holding percentage is a proxy for the amount of the financial stake in the firm held by the directors. Higher ownership percentage indicates more private information is possessed. The buy-back signal is stronger, the higher the proportion of management ownership in the firms (Vermaelen 1981). Raad and Wu (1995) show that management ownership has a significant and positive effect on share return. In contrast, Vafeas and Waegelein (1998) find a significantly inverse relation between ownership and return performance. OWNY represents the ownership percentage held by the trading directors. It is expected that the level of abnormal returns will be higher if the ownership percentage associated with the person conducting the inside transaction is larger.

Firm Size

The hypothesis of undervaluation is based on the assumption that there is an informational difference between the insiders and outsiders about the true value of the firms. The degree of information asymmetry is expected to be inversely related to the size of the firms. Therefore, share repurchases made by small-size firms should signal more information than for large-size firms and empirical support for this has been documented (Vermaelen, 1981; Lakonishok and Vermaelen, 1990). It is also expected that the smaller firms are more likely to be misvalued. Therefore, there is a higher likelihood that smaller firms use share repurchases as a means to correct misvaluation. Firm size is estimated as the log value of total assets (LnTAY-1). A negative (positive) relation is expected between firm size and abnormal returns (repurchase decision).

Share Repurchase

Many US studies examining the market reaction of share repurchase announcements report positive returns (Vermaelen, 1981; Vermaelen, 1984; Comment and Jarrell, 1991; Ikenberry, Lakonishok and Vermaelen, 1995). The finding of positive returns provides support to the information signaling hypothesis that undervaluation is a motivation for share repurchase. The relation between abnormal returns and the number of repurchase transactions is examined in regression model (1).

Interactive Term of Insider Trading and Repurchase Activities

Both insider trading and share repurchase are argued to be informative to investors. The individual impacts of insider trading and repurchase activities on the market are captured in NetInsiderY and ReptranY respectively. This study introduces an interactive term (InterIRY) to capture the combined effect of the informativeness of insider trading and repurchase activities. The significance of this variable provides evidence on the relative pricing effects of these two informed signals and the credibility of the undervaluation message.

Leverage

When firms have surplus cash flow, a share repurchase is one way to distribute the excess capital to investors. Likewise, when the firms have unused debt capacity, a share repurchase can also be a means to achieve the optimal leverage ratio. Besides finding evidence to support the signaling hypothesis, Pugh and Jahera (1990) also mention that share repurchases can move the firms closer to their optimal capital structure. Firms with leverage ratios lower than the optimal level would be more likely to conduct share repurchases. Therefore, a negative relation is expected between LeverageY-1 and share repurchase activity. LeverageY-1 is the difference between the debt to asset ratio of firm i at year y-1 and the median debt-to-asset ratio of all firms of industry k at year y-1.

4. Empirical Results

4.1 Abnormal Share Price Performance

Table 2 reports the event study results for share repurchase transactions from day -10 to day +250.[11] For the whole repurchase sample, the pre-event period ($-10 \leq t \leq -1$) abnormal return is negative and significant at the 0.1 level. This result is consistent with the hypothesis of this study and with previous studies (Vermaelen, 1984; Comment and Jarrell, 1991; Raad and Wu, 1995) that firms buy their shares when they are at low prices. The positive and significant cumulative abnormal returns in the post-event periods (from period $+10 \leq t \leq +60$ onwards) indicate that the "Repurchase" action is effective in correcting the previous undervaluation.

To test the hypothesis that a "double purchase" by the firms and the directors gives a stronger signal of undervaluation to the market, the abnormal returns from day -10 to day +250 are measured. The whole sample is divided into three main groups. The "Repurchase and Sell" subsample includes events where there is a "buy" signal from the firms and a "sell" signal from the directors. The "Repurchase and Buy" subsample consists of cases where there are "buy" signals from both the firms and the directors. The "Repurchase" subsample refers to the share repurchase observations where there is no director trading during the specified period. It is expected that the abnormal returns should be the highest for the "Repurchase and Buy" subsample, followed by the "Repurchase" subsample and the "Repurchase and Sell" subsample.

When we divide the 10,076 observations in "All Repurchase Transactions" into the three subsamples, there are 1,399 observations in the "Repurchase and Sell" subsample, 4,357 observations in the "Repurchase and Buy" subsample and 4,320 observations in the "Repurchase Only" subsample. All these subsamples earn long-term positive abnormal returns, but with the "Repurchase and Sell" subsample earns the smallest return (3.63% in the $+10 \leq t \leq +250$ period) among the three subsamples ("Repurchase and Buy" subsample and the "Repurchase Only" subsample earn 8.53% and 8.52% in the $+10 \leq t \leq +250$ period, respectively).

[11] Observations with abnormal returns in the top 1% and bottom 1% of the total observations are deleted in order to eliminate the effects of outliers. Both parametric and non-parametric tests are performed to check the significance of the abnormal returns. The two methods are qualitatively the same and only the results using the parametric method are reported.

However, in Hong Kong, the share repurchase and insider trading activities are day-to-day events. The Hong Kong directors are frequent traders and often may reverse their trades (buy, sell, buy, sell, etc). In order to avoid the confusion in market reaction due to inconsistent trading signals conveyed by the firms (share repurchase) and directors (buy and sell at the same time), among the "All Repurchase Transactions" sample, we select the "First Repurchase Transactions" for further analysis. To be selected into the "First Repurchase Transactions" sample, the observation should be the first repurchase transaction in the share repurchase program conducted by the firms or if there is no repurchase transaction 60 days prior to and 60 days after that repurchase transactions. Among the 10,076 observations, we have 607 "First Repurchase" transactions. From these 607 observations, we divide them into 110 observations of "Repurchase and Sell" subsample, 236 observations of "Repurchase and Buy" subsample and 261 observations of "Repurchase Only".

Comparing the three subsamples, both the two "Buy" subsamples ("Repurchase and Buy" and "Repurchase Only") earn positive abnormal returns while the "Repurchase and Sell" suffers from negative abnormal returns. The positive returns for the "buy" signal indicate that the share repurchase and directors' purchase perform their signaling function to convey the undervaluation message. An informed purchase is a signal for a future increase in share price. Consistent with our expectation that the dual purchase signal from the firms and the directors should be a stronger signal of undervaluation, the "Repurchase and Buy" subsample earns a higher level of returns than the "Repurchase Only" subsample in the long-term periods. The higher returns accruing to the "Repurchase and Buy" subsample indicate that double signals: share repurchases by the firms and directors' purchase create a more credible signal of undervaluation than share repurchase alone.

Although the share repurchase signal is a credible message of undervaluation, it is not as effective as the "Sell" signal in conveying an overvaluation message. The negative abnormal returns in the "Repurchase and Sell" subsample mean that a directors' sale is a stronger signal than a share repurchase. The differences in abnormal returns for different combinations of share repurchase and directors' trading suggests that the market evaluates the joint signals. The magnitude of the share price movement reflects the strength of the different signals of informed trading. Figure 1 plots the CAR path for the three subsamples from -10 to +250.

4.2 Abnormal Insider Trading Activity

This study examines the insider trading activity around the time when the firms undertake their share repurchase transactions. Table 3 reports that insider purchase activity before a repurchase is abnormally and significantly higher than the expected level of insider share purchases. An insider sale before a repurchase event is abnormally lower than the expected level of insider sales. During the repurchasing month, there is no significant insider trading activity.

Lee, Mikkelson and Partch (1992) report results consistent with the hypothesis that managers trade to personally benefit from the favourable undervaluation information. In our study, we find similar results. The consistent trading decisions found suggest that the firms repurchase and / or the directors buy their firms' shares because they believe the shares are undervalued. Our results provide evidence to support the information signaling hypothesis in explaining both the share repurchase and insider trading phenomena.

4.3 Regression Analysis

The results of the regression analysis with the abnormal returns as the dependent variable (regression model (1)) and the Tobit model (regression model (2)) are reported in Table 4. The relation between the magnitude of the market reaction and the variables (CFY-1, CashY-1, DividendY-1, MKBKRY-1, AbRetY-1, NetInsiderY, OWNY, LnTAY-1, ReptranY, InterIRY and LeverageY-1) are examined over both the short term ($-1 \leq t \leq -1$, $-3 \leq t \leq +3$) and the long term ($-10 \leq t \leq +200$, $-30 \leq t \leq +30$, $-30 \leq t \leq +120$ and $-30 \leq t \leq +200$) periods. The t-statistics for the coefficients in the regressions are adjusted for heteroskedasticity using White's procedure (1980).

4.4 Excess Capital

Stephens and Weisbach (1998) report a positively significant relation between share repurchase and cash flow (expected as well as unexpected cash flow). In many sample periods, Dittmar (2000) finds that firms do not replace dividends with share repurchases but use buy-backs as an alternative means to distribute excess cash. In Table 4, the only variable testing the free cash flow hypothesis which is significant is CFY-1. The positive significance of CFY-1 in model (1) suggests that the market reaction and motivation for a share repurchase are determined by the amount of excess cash flow. However, the regression result (model (2)) shows that share repurchases and dividends (DividendY-1) are not substitutes.

4.5 Information Signaling

Table 4 reports that MKBKRY-1 is significantly and AbRetY-1 is insignificantly related to the level of abnormal returns (model (1)). The negative coefficients on MKBKRY-1 are consistent with those of Lakonishok, Shleifer and Vishny (1994), Ikenberry, Lakonishok and Vermaelen (1995) and Dittmar (2000) which show that firms with low market-to-book value are undervalued and underinvested. Therefore, share repurchase activity is a signal to the market that firms invest in their own shares when their shares are at a low price. However, MKBKRY-1 is not significant in the Tobit model. Although a low market-to-book ratio is an indicator of undervaluation and underinvestment, share repurchases may not necessarily be the only investment to consume the asset potential. Similar to the finding of Dittmar (2000) on historical return, AbRetY-1 is not significant in model (2). However, Stephens and Weisbach (1998) report a negatively significant relation between quarterly share repurchases and previous quarter returns. As Stephens and Weisbach use quarterly data and Dittmar as well as this study use yearly data, the insignificance of AbRetY-1 may be due to the mismatch of time periods used to measure historical return and share repurchase activity.

The coefficients on NetInsiderY[12] are not significant in Table 4. The insignificance of the variable representing insider trading activity suggests that the market reaction around the repurchasing period is not affected by the trading of the directors. The inconsistent trading signals (buy and sell around the share repurchase transactions) of the directors may have confused the market. While it is hypothesized

[12] Besides using the net number of shares as an insider trading measure, this study repeats the regression analysis with other measures such as the number of purchased shares, the number of sold shares, market value (net, purchased and sold) and number of transactions (purchased and sold). The results are qualitatively the same across all measures.

that there should be a positive relation between share price performance and ownership percentage of trading directors (OWNY), a negative association is found in this study. The negative and significant relation between the ownership percentage and abnormal returns is inconsistent with that of Raad and Wu (1995) but provides support to the entrenchment hypothesis (Morck, Shleifer and Vishny, 1988; McConnell and Servaes, 1990; Kole, 1995). The entrenchment hypothesis suggests that the lower the percentage of management shareholding, the higher the value of the firm. Both NetInsiderY and OWNY are not significant in the Tobit model. These results imply that the directors do not make consistent trading decisions for their firms and their personal accounts.

The coefficients on LnTAY-1[13] are negatively and positively significant in model (1) and model (2) respectively. The negative relation between the market reaction to share repurchase transactions and firm size indicates that share repurchase activity is more effective in correcting the misvaluation or underpricing for smaller firms. However, the positive and significant coefficient on LNTAY-1 in the Tobit model shows that there is a higher likelihood for larger firms to conduct a share repurchase. Dittmar (2000) argues that large firms may also be misvalued and use share repurchases to buy misvalued shares. Owing to the limited information disclosure[14] and the highly concentrated ownership structure by families in Hong Kong (Claessens, Djankov and Lang, 2000), the degree of informational difference between the market and the firms may not necessarily depend on the size of the firms. Share repurchase can be a means for both large and small firms to reveal the true value of the firms. However, large firms may have more asset potential to conduct the repurchase investment.

While there is an insignificant relation between abnormal returns and insider trading activity, the positive and significant coefficients of ReptranY, particularly over the long term, provide evidence on signaling as a motivation for share repurchases. The insignificance of NetInsiderY and InterIRY in regression model (1) indicates that share repurchase is a stronger and more credible signal than directors' trading in signaling undervaluation. The frequency of repurchase activity is positively related to the magnitude of abnormal returns.

4.6 Leverage

Dittmar (2000) finds evidence that a share repurchase can be used to alter the leverage ratios. The Tobit model result shows that there is a negative but insignificant relation between the leverage ratio[15] and the share repurchase decision. This finding implies that firms with a lower than optimal leverage ratio are more likely to repurchase shares. However, a low leverage ratio is not a significant factor that motivates firms to engage in share repurchase activity. LeverageY-1 is positively related to the level of abnormal returns in regression model (1). If firms with a high leverage ratio are perceived as poorly performing firms, highly geared firms should have a history of low returns. Therefore, the market reaction around the share repurchase transactions may express an undervaluation signal leading to an increase in price.

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[13] This study also uses the log value of the market value of the firm (closing price times the number of outstanding shares) as the proxy of firm size. The results are qualitatively the same as those when the log value of total assets is used.

[14] There are few voluntary information disclosures made by the management of the firms in Hong Kong. External analyst reports are usually restricted to a few large firms.

[15] The leverage measure used in the regression model is the ratio of net debt to total assets. For robustness, the regression analysis is repeated with another measure of leverage (total debt to total assets). However, the use of different leverage measures does not change the results qualitatively.

5. Conclusion

This study makes use of the insider trading data around the repurchasing period in order to examine the information signaling motivation for share repurchases in Hong Kong. Analyses are performed to investigate the intensity of the insider trading activity and share price reaction during the time when the firms buy their shares back. The directors do not exclusively make a purchase decision for their own investment portfolios to complement the buy-back transactions of the firms, they also make sell transactions. Although the quantity and value of directors' purchases are higher than those of sales, the intensity of buying activity is not abnormally greater than that of the selling activity during the share repurchase period. On the contrary, the net insider trading activity is negatively significant.

The results from the event study provide support for the information signaling hypothesis that the "Buy" signal earns positive abnormal returns. The market does not evaluate the various signals of informed trading in isolation. Although, the "Buy" signal can perform its signaling function to express an undervaluation message, the higher abnormal returns for the "Repurchase Only" subsample suggest that the "Repurchase" signal of the firms is a more credible signal for undervaluation than the "Purchase" signal of the directors. However, the signaling power of the undervaluation message conveyed by the "Repurchase" transactions of the firms is not as effective as that of the overvaluation message revealed by the "Sell" transactions of the directors. Negative abnormal returns are found for the "Repurchase and Sell" subsample.

The regression analysis shows that those variables (MKBKRY-1, LnTAY-1 and ReptranY) representing the proxies of undervaluation and capital structure (LeverageY-1) exert more influence on the magnitude of abnormal returns for share repurchases. However, the Tobit model does not provide evidence that information signaling is a dominant factor in motivating the share repurchase decision.

In conclusion, this study provides weak evidence for the information signaling purpose of share repurchases. It is assumed that there should be a consistent signal conveyed by share repurchases and directors' dealings (i.e., a share repurchase with a director purchase rather than a share repurchase with a director sale) in order to transmit a credible undervaluation message. Although the abnormal share price analysis shows that there are abnormal returns for the "Repurchase" and "Repurchase and Buy" subsamples, the results from the abnormal informed trading volume analysis report that the director purchase activity is not abnormally greater. In addition, the Tobit analysis finds that the information signaling function is not a major purpose for share repurchase.

These findings are in contrast to those reported in the US studies. In the US, share repurchase is a good and true signal for undervaluation. The insiders buy before the share repurchasing period. In Hong Kong, owing to various reasons such as share price manipulation and sequencing of corporate events by the firms, it is not clear whether share repurchase is being used as a tool to increase or to boost up share price, rather than serving as a signal for undervalued share.

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Table 1. Summary Statistics of the Sample

Panel A: Characteristics of Share Repurchase Activity

Year	Number of Firms	Number of Shares ('000,000)	Market Value (HK$'000,000)	Number of Transactions	% of Repurchased Shares to Outstanding Shares
1993	17	165.0505	254.247	157	0.09%
1994	70	493.3649	2044.11	1083	0.06%
1995	66	256.7816	924.424	944	0.05%
1996	40	273.5137	873.195	511	0.11%
1997	100	911.8881	4560.26	1097	0.09%
1998	109	896.68	1822.8	1678	0.05%
1999	54	723.6108	13563.1	854	0.08%
2000	102	1625.558	3616.09	1744	0.06%
2001	79	1200.418	1455.48	1278	0.08%
2002	57	890.4514	884.361	730	0.07%
Total	694	7,437.32	29,998.09	10,076	
Average					0.07%

Panel B: Distribution of Time Length between Two Consecutive Repurchase Transactions in terms of the Number of Trading Days

Time Length in terms of Number of Trading Days	Number of Repurchase Transactions	Percentage to Total Number of Repurchase Transactions	Cumulative Percentage to Total Repurchase Transactions
1	5661	57.84%	57.84%
2	1176	12.02%	69.86%
3	555	5.67%	75.53%
4	381	3.89%	79.42%
5	217	2.22%	81.64%
6	170	1.74%	83.38%
7	124	1.27%	84.64%
8	109	1.11%	85.76%
9	87	0.89%	86.65%
10	72	0.74%	87.38%
11	69	0.71%	88.09%
12	55	0.56%	88.65%
13	43	0.44%	89.09%
14	44	0.45%	89.54%
15	37	0.38%	89.92%
16	44	0.45%	90.36%
17	23	0.24%	90.60%
18	24	0.25%	90.84%
19	25	0.26%	91.10%
20	27	0.28%	91.38%
> 20	844	8.62%	100.00%
Total	9787		

Table 2. Abnormal Returns for Share Repurchase Activity

"Buy" sample consists of inside transaction where there is a net purchase of shares (the quantity of shares purchased exceeds the quantity of shares sold). "Sell" sample consists of inside transaction where there is a net sale of shares (the quantity of shares sold exceeds the quantity of shares purchased). N is the number of observations in the sample. t-statistics for average abnormal returns (AARs) and cumulative abnormal returns (CARs) are shown in parentheses.

	All Repurchase Transactions				First Repurchase Transactions			
Event Window	All Repurchase [10076]	Repurchase and Sell [1399]	Repurchase and Buy [4357]	Repurchase Only [4320]	All Repurchase [607]	Repurchase and Sell [110]	Repurchase and Buy [236]	Repurchase Only [261]
-60-1	-0.0364	-0.0394	-0.0416	-0.0299	-0.0766	-0.0700	-0.0852	-0.0707
	(-9.89)**	(-6.85)**	(-7.63)**	(-5.80)**	(-5.89)**	(-2.16)*	(-3.85)**	(-3.72)**
-30-1	-0.0291	-0.0434	-0.0313	-0.0216	-0.0805	-0.0863	-0.0794	-0.0784
	(-11.19)**	(-10.67)**	(-8.12)**	(-5.92)**	(-8.75)**	(-3.77)**	(-5.08)**	(-5.83)**
-10-1	-0.0128	-0.0243	-0.0151	-0.0062	-0.0571	-0.0697	-0.0536	-0.0543
	(-8.55)**	(-10.34)**	(-6.80)**	(-2.95)**	(-10.75)**	(-5.28)**	(-5.94)**	(-6.99)**
-1+1	-0.0021	-0.0063	-0.0018	-0.0011	-0.0113	-0.0211	-0.0124	-0.0054
	(-2.60)**	(-4.87)**	(-1.45)	(-0.93)	(-3.87)**	(-2.92)**	(-2.51)*	(-1.28)
0	0.0001	-0.0015	0.0002	0.0007	0.0005	-0.0091	-0.0001	0.0057
	(0.30)	(-2.03)*	(0.28)	(0.98)	(0.33)	(-2.19)*	(-0.04)	(2.34)*
-3+3	-0.0055	-0.0141	-0.0069	-0.0010	-0.0196	-0.0334	-0.0189	-0.0136
	(-4.39)**	(-7.19)**	(-3.72)**	(-0.54)	(-4.41)**	(-3.02)**	(-2.50)*	(-2.10)*
-5+5	-0.0091	-0.0242	-0.0106	-0.0021	-0.0330	-0.0563	-0.0307	-0.0236
	(-5.78)**	(-9.83)**	(-4.53)**	(-0.93)	(-5.92)**	(-4.07)**	(-3.24)**	(-2.89)**
-10+10	-0.0181	-0.0378	-0.0240	-0.0047	-0.0628	-0.0882	-0.0606	-0.0529
	(-8.30)**	(-11.11)**	(-7.44)**	(-1.53)	(-8.16)**	(-4.61)	(-4.63)**	(-4.70)**
+1+10	-0.0054	-0.0120	-0.0091	0.0009	-0.0063	-0.0094	-0.0069	-0.0043
	(-3.58)**	(-5.11)**	(-4.07)**	(0.42)	(-1.19)	(-0.71)	(-0.77)	(-0.55)
+10+60	0.0078	-0.0065	0.0201	-0.0002	-0.0033	-0.0329	-0.0071	0.0064
	(2.29)*	(-1.22)	(4.00)**	(-0.04)	(-0.28)	(-1.10)	(-0.35)	(0.37)
+10+120	0.0366	0.0265	0.0488	0.0270	0.0296	-0.0530	0.0512	0.0268
	(7.31)**	(3.38)**	(6.59)**	(3.85)**	(1.67)	(-1.20)	(1.70)	(1.04)
+10+150	0.0437	0.0265	0.0504	0.0428	0.0367	-0.0813	0.0467	0.0568
	(7.74)**	(3.00)**	(6.03)**	(5.41)**	(1.84)	(-1.64)	(1.38)	(1.95)
+10+200	0.0571	0.0222	0.0596	0.0663	0.0551	-0.1140	0.0849	0.0657
	(8.70)**	(2.16)*	(6.13)**	(7.21)**	(2.37)*	(-1.97)*	(2.15)*	(1.94)
+10+250	0.0785	0.0363	0.0853	0.0852	0.0650	-0.1413	0.1009	0.0790
	(10.63)**	(3.15)**	(7.80)**	(8.25)**	(2.49)*	(-2.18)*	(2.28)*	(2.07)*

** significant at the 0.01 level

* significant at the 0.05 level

Table 3. Abnormal Insider Trading Activity before Share Repurchase Event

"Buy" sample consists of inside transaction where there is a net purchase of shares (the market value of shares purchased exceeds the market value of shares sold) over the six-month period between $-6 \leq m \leq -1$ before the share repurchase event. "Sell" sample consists of inside transaction where there is a net sale of shares (the market value of shares sold exceeds the market value of shares purchased) over the six-month period between $-6 \leq m \leq -1$ before the share repurchase event. A positive sign for the market value indicates there is a higher market value for purchased transactions than for sold transactions.

Event Month	Net Sell		Net Buy	
	Market Value (HK$'000,000)	t-values	Market Value (HK$'000,000)	t-values
-6	-8.6687	-1.78	14.44	8.00**
-5	-16.3124	-3.34**	8.6447	4.79**
-4	-1.2826	-0.26	6.0744	3.36**
-3	-7.0468	-1.44	4.1359	2.29*
-2	5.3628	1.10	5.3968	2.99**
-1	-0.1548	-0.03	1.8012	1.00
0	1.9520	0.40	1.6107	0.89
-6 to – 1	-28.1024	-2.35*	40.4940	9.15**

** significant at the 0.01 level
* significant at the 0.05 level

Table 4. Regression Analysis

$$CAR = \alpha_0 + \beta_1 CFY\text{-}1 + \beta_2 CashY\text{-}1 + \beta_3 DividendY\text{-}1 + \beta_4 MKBKRY\text{-}1 + \beta_5 AbRetY\text{-}1 + \beta_6 NetInsiderY + \beta_7 OWNY + \beta_8 LnTAY\text{-}1 + \beta_9 ReptranY + \beta_{10} InterIRY + \beta_{11} LeverageY\text{-}1 \quad (1)$$

$$RepshareY = \alpha_0 + \beta_1 CFY\text{-}1 + \beta_2 CashY\text{-}1 + \beta_3 DividendY\text{-}1 + \beta_4 MKBKRY\text{-}1 + \beta_5 AbRetY\text{-}1 + \beta_6 NetInsiderY + \beta_7 OWNY + \beta_8 LnTAY\text{-}1 + \beta_9 LeverageY\text{-}1 \quad (2)$$

CAR is average abnormal return or cumulative abnormal return over different time periods examined. CFY-1 is the ratio of cashflow from operations to total assets at year y-1. CashY-1 is the ratio of the sum of cash and marketable securities to total asset at year y-1. DividendY-1 is the aggregate amount of dividends paid (interim, special cash and final) divided by net income before extraordinary items at year y-1. MKBKRY-1 is the ratio of the sum of market value of equity and total liabilities to total assets at year y-1. AbRetY-1 is the market adjusted abnormal return from year end y-2 to year end y-1. NetInsiderY is the measure of insider trading activity (percentage of net number of shares traded to the number of outstanding shares) at year y. OWNY is the percentage of trading insider ownership to number of outstanding shares at year y. LnTAY-1 is the log value of total assets at year y-1. ReptranY is the log value of the number of transactions at year y. InterIRY is an interactive term of insider trading and share repurchase activities (the product of NetInsiderY and ReptranY). LeverageY-1 is the difference between the debt to asset ratio of firm i at year y-1 and the median debt-to-asset ratio of all firms of industry k at year y-1. RepshareY is the ratio of the number of repurchased shares to the number of outstanding shares at year y. t-statistics are adjusted for heteroskedasticity with White's procedure (1980).

	Model (1)						Model (2)
	-1≤t≤+1	-3≤t≤+3	-10≤t≤+200	-30≤t≤+30	-30≤t≤+120	-30≤t≤+200	
				Coefficient			
				(t-statistics)			(z-value)
Intercept	0.0741	0.0702	0.5952	0.2656	0.4140	0.6030	-0.0630
	(1.53)	(1.09)	(2.41)	(1.76)	(1.96)	(2.34)	(-5.44)
CFY-1	0.0490	0.0738	0.4222	-0.0124	0.0955	0.4489	0.0036
	(1.54)	(1.62)	(2.09)**	(-0.11)	(0.57)	(2.01)**	(0.51)
CashY-1	0.0903	0.0982	0.5300	0.2567	0.4082	0.5572	-0.0051
	(1.44)	(1.14)	(1.56)	(1.49)	(1.29)	(1.53)	(-0.40)
DividendY-1	0.0140	-0.0027	0.0151	-0.0059	-0.0110	0.0148	0.0005
	(1.62)	(-0.17)	(0.70)	(-0.69)	(-0.67)	(0.63)	(0.61)
MKBKRY-1	-0.0085	-0.0096	-0.0521	-0.0444	-0.0492	-0.0616	-0.0003
	(-3.39)***	(-2.79)***	(-2.88)**	(-3.28)***	(-2.82)***	(-2.95)***	(-0.32)
AbRetY-1	0.0067	0.0009	-0.0456	-0.0354	-0.0404	-0.0569	0.0016
	(0.96)	(0.09)	(-0.85)	(-1.35)	(-0.90)	(-0.95)	(0.83)
NetInsiderY	0.2632	0.1312	-0.1856	-0.5111	-1.5851	-0.3381	0.0004
	(1.09)	(0.45)	(-0.09)	(-0.62)	(-0.91)	(-0.17)	(0.02)
OWNY	-0.0100	-0.0321	-0.1650	-0.0602	-0.0627	-0.2019	0.0065
	(-0.70)	(-1.57)	(-2.11)**	(-1.26)	(-0.94)	(-2.38)**	(1.74)
LnTAY-1	-0.0058	-0.0051	-0.0539	-0.0220	-0.0403	-0.0566	0.0026
	(-1.90)	(-1.27)	(-3.53)***	(-2.39)**	(-3.07)***	(-3.55)***	(3.53)***
ReptranY	0.0032	0.0031	0.0928	0.0306	0.0718	0.1075	
	(0.77)	(0.62)	(3.96)***	(2.18)**	(3.29)***	(4.25)***	
InterIRY	-0.0491	0.0070	0.4730	0.4214	0.9246	0.6392	
	(-0.50)	(0.06)	(0.66)	(1.32)	(1.43)	(0.92)	
LeverageY-1	0.0141	0.0376	0.4539	0.2091	0.3323	0.5120	-0.0074
	(0.45)	(0.84)	(2.73)***	(2.10)**	(2.27)**	(2.85)***	(-1.13)
Adjusted R^2	0.0132	-0.0013	0.0922	0.0612	0.0652	0.1109	0.0014
F	1.3139	0.9671	4.3972	3.0736	3.3095	5.1832	
	(0.22)	(0.48)	(0.00)	(0.00)	(0.00)	(0.00)	

*** significant at the 0.01 level
** significant at the 0.05 level

Figure 1. Cumulative Abnormal Returns Around Share Repurchase Activity From -10 to +250